THE IMPACT OF USING PRIORITY MAIL IN A MIXED MODE SURVEY

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1. Introduction[1]

This paper describes the results of an experiment designed to test the effect of using Priority Mail on the response rate, cost, and length of field period associated with the 1993 Survey of Doctorate Recipients (SDR). The SDR is a mixed mode panel survey of about 50,000 doctorate recipients in the sciences and engineering. The survey has been conducted biennially since 1973.[2] The purpose of the survey is to collect employment and demographic information about the nation's doctoral scientists and engineers who, although comprising only 9 percent of the science and engineering labor force, conduct most of the research and development in these fields. Survey data are widely used by individuals in government, academe, and industry for policy and planning purposes, and by students who are making career choices.

2. Background

Between 1973 and 1989, the SDR was conducted as a mail survey. During this time, the survey experienced a discouraging downward trend in response rates—from a high of about *75* percent in 1973 to a low of 55 percent in 1989. Since the representativeness of the sample may be compromised by declining response rates, the authors decided to use computer-assisted telephone interviewing (CATI) to follow up nonrespondents to the mail survey. In 1991, CATI was added to the data collection protocol. This change, along with others made at the mail phase,[3] increased the final response rate to 88 percent, up 33 percentage points from 1989.

While this increase was noteworthy, it was costly. The cost per completed interview increased dramatically and the additional months needed to locate and interview nonrespondents delayed the publication of results. Accordingly, we were looking for ways to reduce these costs in the 1993 survey when Priority Mail caught our attention.

Priority Mail is a class of mail delivery introduced by the U.S. Post Office in the early 1990s. Priority Mail packages resemble overnight express packages (such as Federal Express) in appearance, but cost much less—$2.90 versus $9.00 or more. The goal of the U.S. Post Office is to deliver these packages within 2 days. Priority Mail was appealing because it was relatively economical and because it appeared to lend a sense of urgency and importance to the survey that might be useful in getting the envelope opened in the first place. However, due to its newness, the literature provided no guidance on the effectiveness of this method. Thus, we decided to test Priority Mail in a controlled experiment in the 1993 SDR. The objective was to learn if Priority Mail could increase the SDR response rate, and if so, where in the mail cycle it could be most effectively used.

From 1973-1991, the SDR had used three questionnaire mailings sent first-class mail. For the experiment, using Priority Mail in the first mailing was rejected as an ineffective use of resources because a core of SDR sample members (about 40 percent) will respond regardless of the postage. Whether to use Priority Mail in a second or third mailing was less clear. If using Priority Mail in the second mailing generated sufficient response, the third mailing could be dropped and this would shorten the field period by one-third (six weeks). Alternatively, using Priority Mail in a third mailing might reduce the total cost by lessening the number of nonrespondents requiring CATI follow-up. (In the SDR, an interview completed by CATI costs more than 10 times as much as an interview completed by mail.) Thus, the design for the experiment emerged.

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[2]SDR is conducted by the National Research Council for the National Science Foundation. Mathematica Policy Research provides technical advice and assistance to the NSF for the operation of the Scientists and Engineers Statistical Data System, of which the SDR is a part.

[3]To maximize the mail response rate, the number of respondent contacts was increased, stamps were used instead of metered postage, and survey materials were personalized.

3. Methodology

The SDR sample was divided into three groups at the outset of the survey. Group 1 would receive two mailings, with Priority Mail used in the second mailing. Group 2 would receive three mailings, with Priority Mail used in the third mailing. Group 3 would receive three first-class mailings and function as the control group. The number and type of mailings in each group are shown in Table 1.

Eligible cases were ordered by the original stratifying variables and assigned to a group through systematic selection. The resulting groups were equivalent in characteristics such as gender, year of degree, field of degree, race/ethnicity, and citizenship status—variables known for the entire sampling frame.

Because making published data available as soon as possible was a priority, 75 percent of the sample was allocated to group 1, the group with the shortest field period. The remaining sample was divided equally between groups 2 and 3 (12.5 percent each). Because the overall sample size was large, small differences between the groups would prove to be statistically significant in spite of the disproportionate allocation.

The three dependent variables of interest were the response rate, the cost per completed questionnaire, and the length of the field period. They were calculated as follows:

Response rates (unweighted) were calculated by dividing the number of usable returns by the number of in-scope sample cases. In-scope was defined as those living in the United States on the reference date who were 75 years of age or younger. Usable returns were those that had a core set of "critical" questions answered.

The *cost per completed questionnaire* was calculated by summing the costs in each group and dividing this total by the number of usable completed questionnaires. Only costs affected by the experiment's design were included. These were costs for printing the survey materials and assembling the mailing packages; postage; data processing for file preparation and receipt control; locating and interviewing the nonrespondents, and staff time for directing these activities.

The *length of the field period* was based on 6 weeks per mailing. In group 1, the field period for the mail phase was 12 weeks; in groups 2 and 3 it was 18 weeks. Since all mail nonrespondents were routed to CATI follow-up at the same time, the length of this phase was constant at 16 weeks.

4. Findings

Major findings of the experiment and other issues concerning the use of Priority Mail are described below:

Response Rates

Table 2 shows cumulative response rates by group. At the completion of mail and CATI, response rates across groups were roughly equivalent, about 87 percent. Thus, using Priority Mail in a mixed mode SDR did not appear to affect the final response rate. When CATI is excluded from the analysis, however, the results differ. If the SDR had been conducted as a mail survey with no telephone follow-up, group 2 would have achieved the highest response rate—73 percent—compared with about 68 percent in groups 1 and 3. Thus, for a "mail only" SDR, using Priority Mail last in a 3-mailing protocol would produce a higher response than using it last in a two-mailing protocol, or not using it at all.

Of additional note, group 1 attained about the same response rate as group 3 at the end of the mail phase. This suggests that, in a mail only SDR, using Priority Mail in a second mailing will produce an equivalent response rate to 3 first-class mailings, but in one-third less time.

Why did the response rate difference at the end of the mail phase disappear after the CATI phase? Most likely because mail nonrespondents were intensively pursued at the CATI stage. Follow-up efforts were halted only after it was clear that few additional nonrespondents were likely to be located or interviewed. This was done in the interest of obtaining the highest overall response rate. Thus, CATI compensated for differential nonresponse at the mail phase because it was continued within group until no longer productive.

Cost per Complete and Length of Field Period

Maximizing response rates is rarely done without considering the potential costs in terms of time and money. Whether to use Priority Mail depends on the relative constraints of 3 factors: response rate, time, and cost. If cost is the major constraint, Table 3 shows that in mixed mode administration, group 2 was least expensive—$22.02 per completed interview compared with $23.11 and $24.81 in groups 1 and 3, respectively. However, group 2 had a longer field period than group 1. Thus, the decision for the SDR is whether having the data available six weeks sooner is worth the additional cost.

For a mail only SDR, group 2 would have obtained the highest response rate, but at the greatest cost—$7.82 per completed interview, compared with $5.49 and $7.28 in groups 1 and 3, respectively. Group 1, on the other hand, had a lower response rate than group 2, but was nearly 25 percent less expensive and could be completed in one-third less time. In comparison, group 3 offered no advantages.

Why did group 2 become the least expensive option in a mixed mode administration? Most likely because the higher mail response rate in this group meant fewer cases required CATI follow-up. In mixed-mode administration, this suggests that the higher costs incurred in the mail phase (by using Priority Mail) are more than offset by lower costs in the CATI phase.

Other Issues

Although response rate, cost, and field period were the primary focus of this experiment, there were other issues concerning the use of Priority Mail. First, we were concerned that Priority Mail might generate a higher refusal rate because the urgency it conveyed and its cost might be viewed by respondents as inappropriate for a government survey. Table 4 shows this concern was unfounded. Although a few respondents said that Priority Mail was a "waste of taxpayer's money" or a "gimmick," the overall refusal rates were not significantly different. After mail and CATI, these ranged from 4.5 percent to 5.1 percent.

Second, there were questions about the effect of Priority Mail on the contact rate to the mail survey, i.e., the percentage of cases who received the questionnaire. Since a higher contact rate would likely have a positive effect on response rates, we wondered if the additional postage might buy "special handling," such that more packages would reach their destination. However, as shown in Table 4, the percentages not contacted in the mail phase were roughly equivalent across groups (ranging from 3.2 to 3.7 percent). This suggests that the increase in response in groups using Priority Mail was not caused by a higher contact rate, but rather by the importance and urgency the package conveyed.

5. Conclusions

The most interesting finding of this experiment was that 3 mailings of first-class mail—the traditional SDR approach—was not the most efficient data collection procedure in either a mixed mode or mail only SDR. It was not the least expensive or least time-consuming option, and in the mail phase, had a lower response rate as well.

Priority Mail, on the other hand, appears to be cost effective in a mail only or mixed mode SDR. The question is not "if' to use Priority Mail but "when." In mixed mode administration, three mailings, with Priority Mail in the last mailing, has the advantage of cost but the disadvantage of time. Alternatively, two mailings, with the last using Priority Mail, is somewhat more expensive but reduces the field period by six weeks. Since both treatments yield roughly the same response rate, the trade-off is between cost and time. Thus, the decision when to use Priority Mail should be made with the goals and resources of the project in mind.

Although the SDR is not likely to be conducted as a mail survey in the future, the results of the mail phase may be of interest to other survey practitioners. This experiment suggests that, in a mail survey, two mailings (the last Priority Mail) should be considered if cost or length of field period is the primary concern. If obtaining the highest response rate is paramount, then 3 mailings (the last Priority Mail) should be considered.

Further research using Priority Mail is needed because the unique nature of the SDR sample—doctoral level scientists and engineers—may be influencing the outcomes. Moreover, we suspect that the initial effectiveness of using Priority Mail might diminish as its newness fades. These possibilities can only be explored through repeated experiments in a wide variety of surveys.

Table 1: Number and Type of Mailings by Group

Mailing	Group 1	Group 2	Group 3
Mailing 1	First-Class	First-Class	First-Class
Mailing 2	Priority	First-Class	First-Class
Mailing 3	--	Priority	First-Class

Table 2: Cumulative Response Rates by Group

Characteristic	Group 1 (2 waves/ last PM)	Group 2 (3 waves/ last PM)	Group 3 (3 waves/ no PM)
	(n=33,720)	(n=5,613)	(n=5,618)
Mailing 1	45.5	45.9	46.4
Mailing 2	67.9 *	63.0	61.2
Mailing 3	--	73.4 **	67.5
CATI	87.3	87.6	86.7

* Significantly different from groups 2 and 3 at the end of mailing 2 ($p < .05$).
** Significantly different from the final mail response rate in groups 1 and 3 ($p < .05$).
SOURCE: 1993 Survey of Doctorate Recipients

Table 3: Response Rates, Cost per Complete, and Length of Field Period, by Group

Characteristic	After Mail			After Mail and CATI		
	Group 1 (2 waves/ last PM	Group 2 (3 waves/ last PM)	Group 3 (3 waves/ no PM)	Group 1 (2 waves/ last PM)	Group 2 (3 waves/ last PM)	Group 3 (3 waves/ no PM)
Response Rate	67.9	73.4	67.5	87.3	87.6	86.7
Cost per Complete	$5.49	$7.82	$7.28	$23.11	$22.02	$24.81
Length of Field Period	12 weeks	18 weeks	18 weeks	28 weeks	34 weeks	34 weeks

SOURCE: 1993 Survey of Doctorate Recipients

Table 4: Selected Survey Outcomes by Group

Characteristic	Group 1 (2 waves/ last PM)	Group 2 (3 waves/ last PM)	Group (3 waves/ no PM)
Total Sample	33,720	5,613	5,618
Total Responses	87.3	87.6	86.7
Mail Responses	67.9	73.4	67.5
CATI Responses	19.4	14.2	19.2
Not Contacted/Not Located			
After Mail	3.7	3.7	3.2
After Mail and CATI	1.5	1.4	1.5
Refusals			
After Mail	0.3	0.4	0.4
After Mail and CATI	4.5	4.7	5.1

SOURCE: 1993 Survey of Doctorate Recipients